

# Algae extracts as a sustainable nitrogen-containing fertilizer

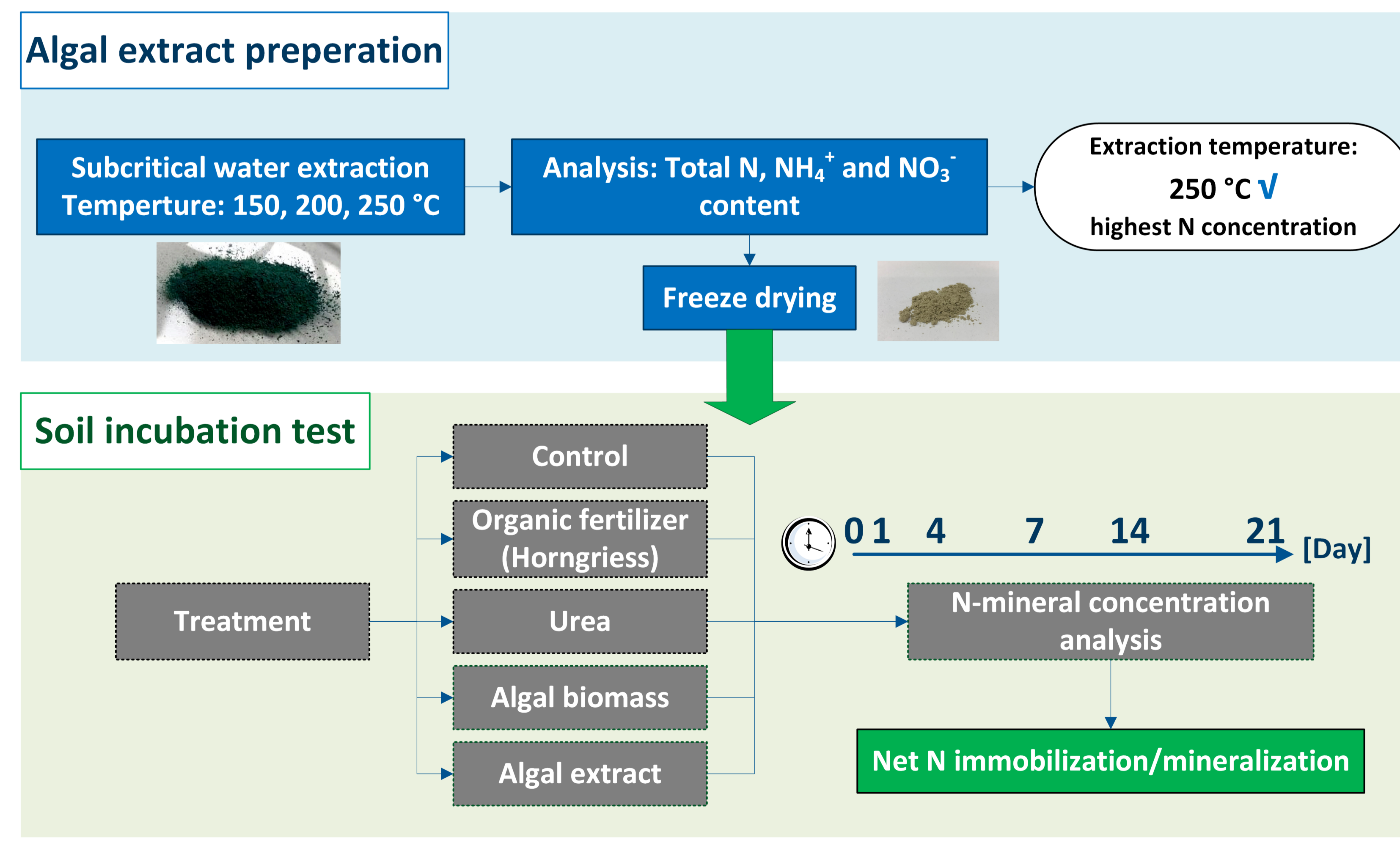
Lin Du<sup>1</sup>, Muhammad-Jamal Alhnidi<sup>1</sup>, Yawen You<sup>2</sup>, Prof. Dr. Andrea Kruse<sup>1</sup>

## Background

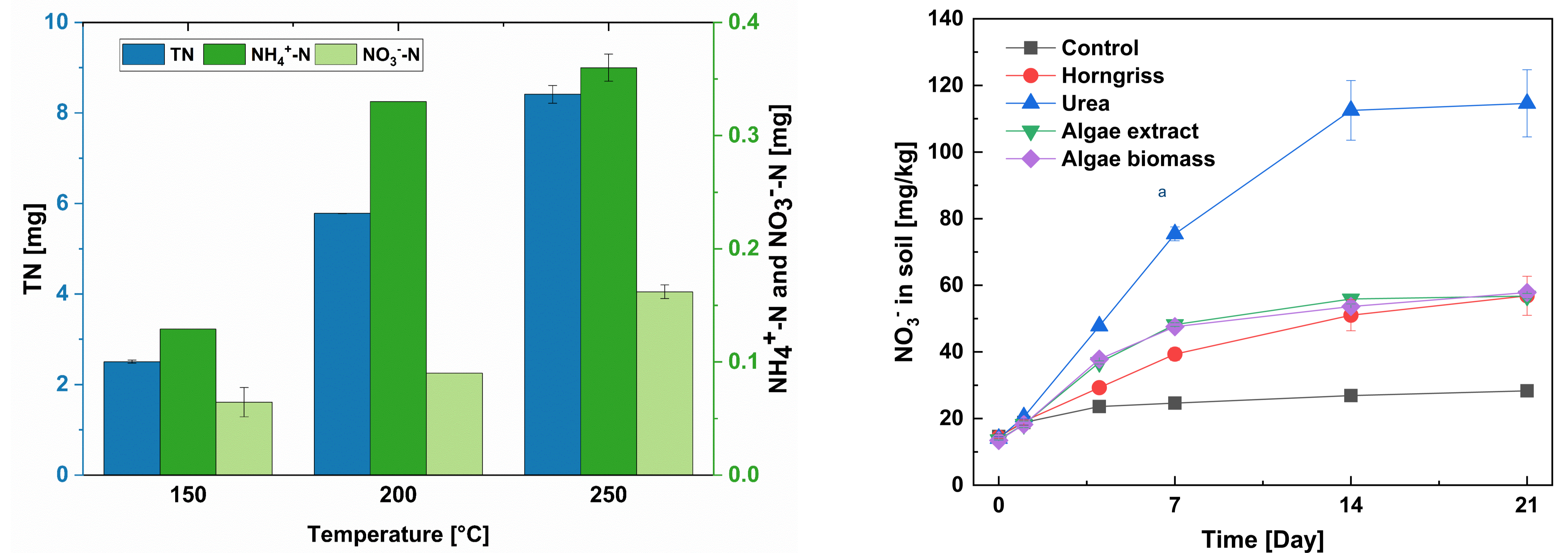
- Nitrogen shortage and loss is a severe global problem [1]
- The application of algal biomass/extracts on soil can recover N nutrient
- *Spirulina platensis* treated with subcritical water [2]

large N-containing molecule (protein)  
↓ hydrolysis  
smaller N-containing pieces (peptides)

## Method



## Results and Conclusion



- The aqueous extract obtained at 250 °C has highest nitrogen content
- Urea (traditional mineral fertilizer) had the highest NO<sub>3</sub><sup>-</sup> in the soil after incubation
- Algal biomass/extract are comparable with Horngriess (common organic fertilizer)
- Application of algal biomass in the soil is promising in the aspect of N recovery

## References

- [1] Alhnidi, M.J., Wüst, D., Funke, A., Hang, L., Kruse, A., 2020. Fate of Nitrogen, Phosphate, and Potassium during Hydrothermal Carbonization and the Potential for Nutrient Recovery. *ACS Sustainable Chemistry and Engineering* 8, 15507–15516. <https://doi.org/10.1021/acssuschemeng.0c04229>
- [2] Du, L., Kruse, A., 2021. Cell disruption and value-added substances extraction from *Arthrospira platensis* using subcritical water. *Journal of Supercritical Fluids* 171. <https://doi.org/10.1016/j.supflu.2021.105193>

<sup>1</sup> Institute of Agricultural Engineering Conversion Technologies of Biobased Resources (440f), University of Hohenheim

<sup>2</sup> Institute of Crop Science Fertilization and Soil Matter Dynamics (340i), University of Hohenheim